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MATHEMATICS EDUCATION PROGRAMS FUNDED UNDER TITLE I ELEMENTARY AND SECONDARY EDUCATION ACT OF 1965.

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THIS COMPENDIUM IS ONE OF A SERIES DESCRIBING CONTINUING TITLE I, ELEMENTARY AND SECONDARY EDUCATION ACT (ESEA) PROJECTS FROM DIFFERENT INSTRUCTIONAL AND SERVICE AREAS. PROGRAM DESCRIPTIONS FOR 25 TITLE I, ESEA PROJECTS INVOLVING MATHEMATICS EDUCATION GIVE A RANGE OF COVERAGE IN DIFFERENT INSTRUCTIONAL AND SERVICE DOMAINS, INCLUDING CURRICULUM DEVELOPMENT, INSERVICE TRAINING, AND SMALL-GROUP INSTRUCTION. FOR EACH OF THE PROJECTS THERE IS INFORMATION REGARDING (1) LOCATION AND TITLE OF THE PROGRAM, (2) PURPOSE OF THE PROJECT, (3) PROGRAM PROCEDURE AND AVAILABILITY OF FACILITIES, AND (4) METHOD OF STUDENT EVALUATION. THE REPORT CONCLUDES WITH A CHAPTER ON THE MECHANICS OF DEVELOPING A COMPREHENSIVE MATHEMATICS PROJECT UNDER TITLE I, ESEA. REPORTED ARE THE FOUR GENERAL AREAS WHICH CONSTITUTE A PROJECT FORMAT--(1) PUPIL EVALUATION, (2) CURRICULUM DEVELOPMENT, (3) TEACHER TRAINING, AND (4) CLASSROOM ORGANIZATIONAL STRUCTURE. EACH OF THESE AREAS IS INTERRELATED AND DEVELOPED IN THAT CONTEXT. FINALLY, PUPIL EVALUATION IN THE PROGRAM IS CONSIDERED UNDER THE THREE PHASES--IDENTIFICATION, DIAGNOSIS, AND ACHIEVEMENT. (RP)

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THE UNIVERSITY OF THE STATE OF NEW YORK/THE STATE EDUCATION DEPARTMENT
OFFICE OF THE COORDINATOR - TITLE I ESEA
ALBANY, NEW YORK 12224

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TITLE I

ELEMENTARY AND SECONDARY EDUCATION ACT OF

1965

The University of the State of New York/The State Education Department/
Office of the Coordinator, Title I, ESEA, Albany, New York 12224

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FOREWORD

The Elementary and Secondary Education Act of 1965, Title I, declaration of policy is: "... to provide financial assistance to local educational agencies serving areas with concentrations of children from low-income families to expand and improve their educational programs by various means which contribute particularly to meeting the special educational needs of educationally deprived children."

As educators it is our mandate to offer comprehensive programs, K-12, for children at all levels of ability, and from various environmental strata. With Title I, ESEA as a tool, we can now provide expanded and improved programs for the economically and educationally disadvantaged child. Our responsibility is to formulate ideas, and to develop, promote, and implement programs concerned with the education of such deprived children.

This compendium is one of a series describing continuing Title I, ESEA projects from different instructional and service areas. The Bureau of Mathematics Education, under the direction of Frank Hawthorne, Chief, in cooperation with Dr. Irving Ratchick, Coordinator of Title I, ESEA, has compiled program descriptions for 25 Title I, ESEA projects involved with mathematics education. The projects selected give a range of coverage in different instructional and service domains, including curriculum development, inservice training, and small group instruction.

In the past two fiscal years, 1966 and 1967, 234 mathematics projects have been funded for approximately 5.1 million dollars. Melvin Mendelsohn, Associate in Mathematics Education, has the responsibility for evaluating Title I, ESEA projects in mathematics education submitted to the State Education Department for funding, and has selected, edited, and prepared for publication the 25 project descriptions. Also included is a suggested format for the development of Title I, ESEA mathematics projects.

Walter Crewson

WALTER CREWSON
Associate Commissioner for Elementary,
Secondary and Continuing Education

PROJECT MATRIX

	INSTRUCTIONAL AREA							LEVEL		TIME OF ACTIVITY			PARTICIPATION	
	Curriculum Development	Grouping	Inservice Training	Reduction of Class Size	Small Group Instruction	Teacher Aides	Team Training	Elementary	Secondary	After School	During School	Summer Session	Public	Non-public
1. Albany	X		X		X	X		X				X	X	X
2. Arlington					X	X			X	X			X	
3. Ballston Spa							X		X	X			X	
4. Buffalo				X	X			X			X		X	X
5. Canajoharie					X			X	X	X	X		X	
6. Dover Plains	X				X				X		X		X	
7. East Irondequoit					X			X				X	X	X
8. East Meadow					X			X	X	X			X	X
9. Ellenville		X	X					X	X		X	X	X	
10. Ithaca		X				X		X			X		X	
11. Lancaster					X			X				X	X	X
12. Lawrence		X		X				X			X		X	X
13. Levittown					X			X		X		X	X	X
14. Locust Valley					X			X	X	X			X	
15. Manlius				X	X			X			X		X	X
16. Mexico					X			X			X		X	
17. New Rochelle	X							X				X	X	X
18. New York City						X			X			X	X	
19. New York City				X	X			X	X		X			X
20. New York City					X				X		X		X	
21. Northport			X			X	X	X				X	X	
22. Plainview		X							X		X		X	X
23. Pulaski	X				X				X		X		X	
24. Warrensburg				X				X			X		X	
25. Washingtonville			X					X	X	X			X	X

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1. ALBANY

Summer Program for Grades 3-8; 550 Disadvantaged Children

Nature of Project: A summer program for educationally disadvantaged children. Classes are conducted at three levels: grades 3-4, 5-6, and 7-8. The maximum number of pupils per class is 18. Each class has assigned to it, a teacher, college aide, and high school aide.

Procedure:

A. Program - Children are selected for the program on the basis of the following criteria: a child must come from the poverty pocket and must be at least 2 years below grade level in reading and mathematics. The next group of children selected are at least 2 years below grade level in either reading or mathematics. Two elementary schools are carrying on the program with approximate enrollments of 300 and 250, respectively. In each school one team is assigned to each of the grade levels: 3-4, 5-6, and 7-8. The team consists of a coordinator, a teacher for each subject area, with a college aide and high school aide assigned to each teacher. With the team organization, small group instruction is possible. There is much utilization of multisensory materials.

The day by day curriculum was prepared during the regular school year under a Title I, ESEA planning grant. Content of the curriculum at the beginning of the program is aimed at two years below grade level.

There are approximately two public school children to one nonpublic school child in the project.

Staff members involved in the program attended inservice activities prior to the start of the project. These sessions were held on Saturdays, during May and June.

B. Evaluation - Each student in the program will be evaluated individually at after school conferences, attended by the student's particular grade level team. Gross evaluation will be made by using the Iowa tests of Basic Skills for successive years. This test is part of the regular school system testing program.

C. Facilities - The Giffen Memorial and Thomas O'Brien Elementary Schools are utilized.

Budget: $317,000; mathematics allocation - $55,800

2. ARLINGTON (Poughkeepsie 1)

Mathematics for the Disadvantaged Student - Grades 7, 8, 9;
80 Disadvantaged Children

Nature of Project: The project is designed to help strengthen the mathematical proficiency of those students who are 2 or more years below grade level, or, who are at or below the 30th percentile as determined by a standardized achievement test in mathematics. Instruction takes place in regular classrooms within small groups, and is planned and taught by a regular classroom teacher trained in mathematics.

Procedure:

A. Program - Individual consideration is given by teacher with the help of teacher aide.

In order to individualize instruction to the utmost, each class is provided with a teacher aide who possesses a strong mathematics background. These aides are college graduates who possess a mathematics major or are mathematics majors who are currently in their senior year. The professional teacher plans all of the instruction and is responsible for all the records. The teacher aide assists in preparing ditto material,

corrects papers for immediate return to pupils, checks pupils' work, passes out and picks up individual pupil progress reports, keeping them up to date, and controls all materials used in class. This permits the teacher to apply all his professional energy for the benefit of the pupils. The program is conducted after school hours. Four classes are in session.

B. Evaluation - Different forms of the California Arithmetic Test will be administered before and after the program. Also, the New York State Junior High School Survey Test in Mathematics will be used as a pre- and posttest standards.

C. Facilities - The program is held in the Arlington Junior High School.

Budget: $18,000

3. BALLSTON SPA (Milton 1)

Opportunity Mathematics Program; 98 Disadvantaged Children

Nature of Project: Opportunity Mathematics is a program of study designed for the educationally disadvantaged students in grades 7-12. It is remedial for some of the students and enrichment for others. There are 4 subdivisions to the program: 7th and 8th grade remedial, 9th grade algebra--general science, 9th grade combination general mathematics--shop, 10th, 11th, and 12th grade general mathematics.

Procedure:

A. Program - Opportunity Mathematics is in operation during the weekdays beginning at 3:00 p.m. and ending at 4:15 p.m. Each program has classes conducted twice a week.

The 7th and 8th grade program utilizes programmed textbooks and tutorial instruction to provide opportunity for students, experiencing difficulty with basic mathematics skills, to build good foundations, and to progress at their own rate.

The 9th grade mathematics-science program is a team teaching effort whereby algebra students understand basic concepts through the motivation of realistic situations which are ordinarily introduced in the general science class.

A team teaching approach is also applied to the 9th grade math-shop program, whereby general mathematics students have the opportunity to solve problems arising directly from the experience of performing practical shop work.

The general mathematics program at grades 10, 11, and 12 provides the opportunity for nonacademic students to understand the "how and why" of mathematics. Emphasis is on presenting mathematics as a way to understand the physical world.

B. Evaluation - Since each program has a different set of objectives, the evaluation procedure will vary. Standardized tests will be utilized from the following: Stanford Achievement Test, Snader General Mathematics Test, Hoyts Mathematics Inventory Test, and the Sequential Test of Educational Progress.

C. Facilities - The Ballston Spa Junior-Senior High School is used to house the entire program.

Budget: $47,600; mathematics allocation - $5,700

4. BUFFALO

PLUS Program; 5,300 Disadvantaged Children

Nature of Project: The PLUS Program provides compensatory education for educationally deprived children in the target areas of Buffalo.

The intent of the program is to provide the additional staff necessary to insure that each elementary school child in the public and private schools of the target area receives maximum exposure to remedial work in reading and in mathematics. The additional staff permits small groups and individuals to work closely with a skilled teacher in specific areas of difficulty, thereby overcoming learning problems.

Remedial teachers in mathematics, and reading work with classroom teachers, help them identify those children who need help. These teachers then provide intensive tutoring in their areas of specialty. By providing this special tutorial assistance, it is possible for the regular classroom teacher to work more effectively with all pupils.

Procedure:

A. Program - Forty-six remedial arithmetic teachers, employing standard remedial material, teach children in public and parochial schools in groups of 6 for 6 or 7 periods per day. Each period is from 30 to 40 minutes in length.

After school, for 2 hours per day, 3 days a week, 120 remedial teachers instruct children in arithmetic. Classes for remedial activities are limited to 6 children. Parochial school children are invited to attend the afterschool activities in the public schools. Standard remedial and special area materials are used for these activites.

B. Evaluation - A regular series of standardized tests will be administered to all children in the Buffalo Public School System. By

means of statistically comparing preprogram tests with results of a series of intelligence and achievement tests to be given after the program, a measure of the effectiveness of the PLUS Program will be obtained in intelligence and achievement level.

California Arithmetic Tests, lower primary, forms W and X, upper primary forms W and X; elementary, forms Y and Z; and junior high, forms Y and Z, will be used to evaluate the arithmetic programs.

All PLUS teachers are supervised and evaluated by both principals and PLUS supervisors. Principals of PLUS schools will be administered a questionnaire constructed by a person outside the Buffalo system evaluating all sections of PLUS.

C. Facilities - 27 public schools are used

Budget: $2,284,000; mathematics allocation - $528,000

5. CANAJOHARIE

Learning Improvement Program; 100 Disadvantaged Children

Nature of Project: The elementary, junior high, and senior high schools are providing tutorial and remedial services to groups of students requiring assistance in mathematics. A sizeable number of students are helped through scholastic tutoring to overcome misunderstandings of a mathematical nature, or to grasp concepts and skills which they were unable to do within the normal classroom framework.

Procedure:

A. Program - Children are selected for the program on the basis of standardized testing, marks, and teacher recommendation. They are then grouped according to specific need. The school system employs the ser-

vices of competent staff members to work during and after school hours, with the underachieving groups. Four to 5 students comprise each group, with each student receiving at least one hour of instruction per week. Grades 3-12 are involved in this project. Home visits, or other contacts are made to insure cooperation and understanding of parents.

B. Evaluation - Comparison of pre- and posttest scores on standardized tests will be made at the conclusion of the program. In the elementary school program the Iowa Tests of Basic Skills will be used, and in the secondary school program the Iowa Tests of Basic Skills and the New York State Junior High School Survey Test in Mathematics will be administered.

C. Facilities - The elementary, junior high, and senior high schools are used.

Budget: $3,500

6. DOVER PLAINS (Dover 2)

Calculator General Mathematics Course; 17 Disadvantaged Children

Nature of Project: The goal of this project is to revitalize the teaching of general mathematics, with current problems from business and industry solved by the utilization of flow charts and calculating machines. These devices tend to catch and hold the interest of educationally disadvantaged students.

Procedure:

A. Program - The classes use typical and current problems from industry and business firms in the local area, as vehicles for presenting basic concepts of mathematics in an interesting and practical form. While

the machine can do the tedious calculating for the student, he must understand the problem clearly enough to feed the machine correct data in proper sequence. This is accomplished by having the student prepare a flow chart of the problem as he plans to present it to the machine. Thus, an attempt is made to improve the student's ability to reason.

During the project, the machines are used for about one-third of the class time. They are also used during a pupil's free period, or after school.

An experimental text is followed in the course.

B. Evaluation - Pupils will be given the Stanford Achievement Tests; different forms for the pre- and posttests.

C. Facilities - Dover Junior-Senior High School, nine calculators (rent free), and nine carrels are used.

Budget: $3,800

7. EAST IRONDEQUOIT (Irondequoit 1)

Corrective Mathematics Instruction--Summer Program; 115 Disadvantaged Children

Nature of Project: This project provides intensive study of mathematics essentials for pupils who are performing at a low level for their chronological age. Many of these children have a deficiency in mathematics which has persisted for some time, and which cannot normally be given sufficient attention by the regular classroom teacher because of lack of time for individual help in the basic areas. A large percentage of these pupils are able to work to their capacity in their regular classrooms, after the foundation of basic skills has again been presented to them in this program. Pupils of nonpublic schools are included in this project.

Procedure:

A. Program - The program is based on a thorough testing program. The program runs for six weeks during the summer. It attempts to meet the children at their level and satisfy their individual needs in regard to mathematics skills. The classes are well under the average size of the regular school year, so that teachers are able to give a great deal of individual help.

B. Evaluation - The S. R. A. Survey Tests will be administered to all pupils in the project. Progress tests will be given during the program, and the pupil's work will be evaluated daily. Attitude changes will be evident from anecdotal records.

C. Facilities - The only facilities needed are five existing classrooms which are not in use during the summer session.

Budget: $9,400

8. EAST MEADOW (Hempstead 3)

Remedial Basic Skills Program, Grades 1-9; 254 Disadvantaged Children

Nature of Project: After school tutorial service is offered at each of the elementary and junior high schools. The additional time and instruction will improve the performance of educationally disadvantaged students in mathematics.

Procedure:

A. Program - Remedial sessions are scheduled after school hours, 4 days a week. A staff of 18 elementary mathematics teachers is assigned to the 8 elementary schools in the district, and 3 mathematics teachers service the junior high schools.

The participants in the program are selected, based upon the following criteria: standardized achievement scores, and teacher and/or guidance counselor evaluation. Students selected for the program are assigned to a teacher in terms of individual need, in limited groups of 3 to 10 students.

Students in grades 1-3 are assigned as necessary for a period of one hour per week in time periods not to exceed 30 minutes. In grades 4-6 assignments are made on the basis of 1½ hours per week. Junior high school students are assigned on the basis of 2 hours per week. The program will run for 30 weeks. The same procedure is used for resident students enrolled in nonpublic schools.

B. Evaluation - Each child will be given a standardized achievement test at the beginning and at the close of the program. The Stanford Achievement Tests, Metropolitan Achievement Tests, and the New York State Junior High School Survey Test in Mathematics will be used.

C. Facilities - All of the elementary and junior high schools of the district.

Budget: $22,500

9. ELLENVILLE (Wawarsing 2)

Blast Off; 120 Disadvantaged Children

Nature of Project: During April, May, and June of the academic year a testing program in mathematics was implemented. Each child in grades 1-8, inclusive, was tested. Children who tested one or more years below their grade placement were identified as educationally deprived in the area of mathematics. On the basis of the cumulative test record in mathematics, students were grouped for instruction.

An inservice course in teaching mathematics to educationally deprived children is conducted during the academic year. This course helps teachers direct their attention and interest toward the problem of the educationally disadvantaged.

The educationally deprived students needing further help after the academic year, are able to attend summer mathematics instruction.

Procedure:

A. Program - The Stanford Achievment Test in mathematics was the standardized test utilized in the testing program. A special group of students who were in grade 3 during the 1965-66 school year but were not promoted, were retained in grade 3 and placed in one group with a special teacher for remedial work. All students in grades 4-9 are grouped into three levels for instruction in mathematics. All students in grades 10 and 11 are grouped into two levels for instruction in mathematics.

All 50 teachers on the staff teaching mathematics K-12 are eligible to attend the inservice course which provides for 15 two-hour sessions. The 10 films and textbooks produced by the National Council of Teachers of Mathematics are used to acquaint the teachers with mathematics fundamentals. The instructor, films, and consultants brought here, show the teachers how this material can be taught to disadvantaged children. A professional library on mathematics and teaching the disadvantaged has been set up in conjunctionwith this inservice course and all teachers are encouraged to utilize the professional books from it. The professional library is maintained as a separate section of the elementary school library.

This project continues the summer mathematics program of 1965-66 with the following modifications:

1. Instead of 4 classes of 20-25 students, there are 6 classes of 15-20 students. The experience last summer showed that 20-25 educationally deprived students in one class becomes too much for one teacher.

2. Summer school started July 5, 1967, and ended August 11, 1967.

3. The Supervisor of Mathematics, during the last half of August, reassigned the student body (grades 1-12) as outlined in the first paragraph. In addition, the annual test results are evaluated and prepared for placing in the hands of each child's teacher at the opening in September, with a program of planned remedial work for the children. Teachers are informed of test results for their groups and individuals in their group. This helps to make teachers aware of areas of strength and weakness, and gives them guidance in future studies and efforts.

B. Evaluation - The testing program will serve as the main evaluation instrument for all activities in this project. If the median growth of the deprived children, as shown by this testing, is 9 months or more for an academic year (the expected average for this period), the program will be judged effective, since past experience shows that these children fall behind expected growth each year and that this loss seems to be cumulative.

The academic year testing program would serve to evaluate this summer activity in the context of the entire year's project. In addition, the Stanford Achievement tests in Mathematics (a different form than that used in the spring testing) would be administered at the end of the summer school. If the median growth of the children as shown by this testing is one month or more, the summer program will be judged as effective.

C. Facilities - Ellenville Central School

Budget: $15,000

10. ITHACA

Meeting the Needs of the Educationally Disadvantaged Through Compensatory Programs - Basic Skills Area; 1370 Disadvantaged Children

Nature of Project: Special programs have been developed in the basic skills areas to overcome deficiencies which are common to educationally disadvantaged children. Typical programs are: a tutorial project, teacher aides, teacher associates, and continuous progress education (a nongraded program).

Procedure:

A. Program - Because programs are focused on disadvantaged children, center-city and certain rural schools receive most of this help.

The programs are still in the early stages--seeking new ways to make these programs effective, often experimenting with small, tailor-made projects to utilize the particular resources offered by the community. The programs should be viewed as exploratory, trying to determine how they may be most useful to the children.

Founded by Cornell students in 1962 as part of the civil rights movement, the tutorial program now includes 150 Cornell students, 90 students from Ithaca College, 6 high school students, and 65 students from DeWitt Junior High School.

Tutors work on a one-to-one basis, offering friendship as well as academic help. The approach is completely individual and may include games and field trips. The tutor sometimes meets the child's family and often takes him to the campus for special events. In junior high schools, tutoring is subject-oriented; in elementary school, the problem is approached through conversation, games, walks, and above all, a warm personal relationship which encourages communication. Cornell students are re-

cruited, interviewed, and assigned by the student executive committee of the Cornell Tutorial. The school volunteer coordinator acts in an advisory capacity only. The student chairman in each school keeps in touch with the tutors, acts as liaison with the administration and, insofar as possible, see that the needs of his school are met.

Twenty-five women, for the most part mothers whose chidren are now in school, are also tutors, usually in the elementary schools. They meet twice a month with various school specialists. These meetings furnish an opportunity to discuss problems and to receive help in a variety of subjects.

High school tutors are members of the National Honor Society and work with junior high school pupils. In DeWitt Junior High School, ninth graders usually work with seventh graders.

Teacher aides are laymen who assist teachers by taking over some of their nonprofessional duties. In the Ithaca schools, the aides work directly with children of limited background or with teachers who work directly with children of limited background, or with teachers who work with the aides. The aides also work in schools where there is a concentration of disadvantaged children. They usually work part-time everyday so that they become a regular and dependable part of the school staff.

There are 30 aides in the district at present. Their backgrounds are almost as varied as their jobs.

All of the 13 elementary schools have some form of nongrading. The introduction of this plan has taken place over a period of 3 years and presents a wide range of school involvement. Although not part of the horizontal reorganization of the program, Ithaca's designation of

staff members as team leaders provides the program with necessary coordination and articulation in each school.

The Ithaca City School District collaborates with the universities in the area, especially in educational research and teacher training. Ithaca has been especially involved in a special teacher preparation program with Cornell. Teacher graduate students enrolled in the Master's program in Education are assigned as half-time members of the staff, thus providing additional part-time personnel in the schools. These two additions, (the team leaders and the teacher associates), hopefully give each elementary school opportunity for necessary articulation and aid efforts to provide instructional programs which recognize individual differences in children. Representing the total professional staff, a districtwide committee plans, implements, and evaluates the inservice program geared to the needs of both staff and the district.

B. Evaluation - A well-rounded testing program, including standardized and locally prepared tests, is conducted to determine pupil progress.

C. Facilities - All the schools of the district

Budget: $173,500; mathematics allocation - $17,400

11. LANCASTER

Elementary Summer Program; 150 Disadvantaged Children

Nature of Project: The project is designed specifically to overcome educational disadvantagement in arithmetic performance. It is a program within a program. Title I students attend the same school and participate in the regular summer elementary program. The program stresses a mathematics-science unit teaching approach with a variety of outdoor activities.

Procedure:

A. Program - The program includes 70 students from private and public schools in grades 3 and 6, and 80 students in first grade. Selection of students (grades 3-6) is based on scores of the Arithmetic Tests for New York State Elementary Schools. Students whose scores fall in the lowest 3 stanine areas for the district are identified as educationally disadvantaged in arithmetic. First grade teachers are asked to rate students "A" to "F" on overall arithmetic performance. Students falling in the "D" and "F" categories are identified as educationally disadvantaged.

Two groups were randomly selected from the educationally disadvantaged population. A control group of 75 students participate in the regular program and have experiences with large and small group instruction, as teachers cooperatively plan activities. As teachers identify specific needs of students in arithmetic, learning activities are designed to provide remediation and reinforcement.

The experimental group is composed of 75 students. An item analysis is made of the pretest to identify specific deficiencies. The children then are divided into groups of 4 (one group of 3) and one teacher assigned to each small group. They receive specific help in arithmetic for two 20 minute periods per day, in addition to participating in the regular summer program.

B. Evaluation - The Stanford Achievement Tests, Form W will be used as the pretest, and Form Y will be used as the posttest.

C. Facilities - Lancaster Public School

Budget: $9,000; mathematics allocation - $2,250

12. LAWRENCE (Hempstead 15)

Improving the Remedial Programs for Educationally Disadvantaged Students; 300 Disadvantaged Children

Nature of Project: The utilization of remedial arithmetic teachers in the elementary schools to help those children who are considerably below grade level in arithmetic skills.

Prior to the implementation of the project during the school year 1965-66, remedial help in arithmetic was not available in any of the Lawrence public schools. The results of standardized tests, as well as the judgment of teachers, administrators, etc., indicated a need for such help for those children whose achievement was considerably below grade level. In an attempt to help teachers in grades 4, 5, and 6 meet the needs and abilities of the children in arithmetic, remedial arithmetic teachers are utilized in an other than customary classroom structure.

Procedure:

A. Program - An experiment has been carried out in one of the elementary schools during the past 5 years. Last year it was extended to the other schools in the district.

Under this plan, the children of a particular grade level leave their regular classrooms for 40 minutes each day and are regrouped according to arithmetic ability. Therefore the children on that grade level most deficient in arithmetic skills are in one class. In this class the teacher can give her full attention to meeting the needs of the disadvantaged learners, a condition not possible in a heterogeneous group. The experience with the experimental program indicated that under this group procedure, the disadvantaged children made greater gains in arithmetic than did similar children taught arithmetic in the heterogeneously grouped self-contained classroom.

One problem arose. The overcrowding in most of the schools made the slower arithmetic classes rather large. This, combined with the wide range of achievement levels in slow classes, made it difficult for the teacher of the slow group to work effectively. This was solved through utilization of remedial arithmetic teachers provided by this project. The low ability class is split in two; half being taken for the 40 minute period by the regularly assigned teacher, and the other half of the class being taken by the remedial arithmetic teacher. This enables the pupils most in need of arithmetic help to work in a class with low pupil-teacher ratio.

Because of the nature of the program, a remedial arithmetic teacher is needed in each of the elementary schools for one-half day to work with the intermediate grade children deficient in arithmetic skills. In addition, in those schools having the largest number of children scoring below the 30th percentile on the Arithmetic Tests for New York State Elementary Schools, the remedial arithmetic teacher is assigned an additional half day to work with the children in the primary grades needing special help, and with those children in the intermediate grades who might need help in addition to that provided during the arithmetic period. Two teachers are assigned to take care of the need for remedial arithmetic instruction in the private and parochial schools.

B. Evaluation - Each child in the program will take the Iowa Tests of Basic Skills at the beginning of the year to determine his arithmetic level. At the completion of the program, an alternate form of the test will be administered to help determine any gains made. Diagnostic tests will also be administered to help teachers determine the weaknesses of the various pupils so that the program may be structured accordingly.

C. Facilities - The program is carried out in each elementary school.

Budget: $52,400

13. LEVITTOWN (Hempstead 5)

Center for Learning Development; 425 Disadvantaged Children

Nature of Project: The Center is established to diagnose specific learning difficulties, to provide preventive and remedial instruction, and to explore causes of learning difficulties and possible new avenues of learning development. Presently the center carries on diagnostic procedures as well as remedial instruction in mathematics and certain areas of the language arts. Referrals are accepted of public and nonpublic school pupils who reside in the school district.

Procedure:

A. Program - Pupils are grouped for a course of instruction in accordance with the diagnostic information forwarded by their schools, together with the results of diagnostic tests administered at the Center. A typical class group consists of 4 to 8 students of similar age, grade, intellectual capability, and type of difficulty identified by the completed diagnosis.

Each student referred to the Center receives a 15 hour course of instruction based upon the results of the diagnostic testing. Two 15 hour courses are in operation; one during the fall semester, and one during the spring semester. Classes are in operation after school hours and during the summer months.

Student seats at the Center are allotted to the respective public and nonpublic schools in proportion to the school's student regis-

tration. One out of every 5 students attending the Center is referred from a nonpublic school. There is a total program enrollment of 300 students per session.

B. Evaluation - The Metropolitan Achievement Tests and informal mathematics inventories are administered during a testing session prior to the beginning of the course. At the end of each period of instruction, an evaluation of each child's progress is made, using alternate forms of the Metropolitan Achievement Tests to measure growth.

C. Facilities - A rented facility located at the South Valley Green is utilized. It was remodeled to suit the needs of a central location. The site houses the central staff of the center, and has 10 classrooms to accommodate the small groupings of pupils.

Budget: $110,000; mathematics allocation - $33,000

14. LOCUST VALLEY (Oyster Bay 3)

Remedial Mathematics; 139 Disadvantaged Children

Nature of Project: The program is designed to give remedial aid to those children currently in grades 3-12 who are classified as underachievers in mathematics. The prime objective of the program, at both the elementary and secondary levels, is to upgrade the mathematics competency of those children identified as underachievers. In grades 3-8, underachievement is defined as being 1 year or more below grade level on a basis of standardized test results.

Procedure:

A. Program - On the basis of the standardized test results, children are identified as underachievers and their parents notified of the availability of the program. One and one-half hours of mathematics instruction

per week is given each student in addition to his regular classroom instruction. The size of each class is limited to 8 students. Elementary school students attend sessions in the afternoon, and secondary school students attend sessions in the morning. Pupils are expected to attend the program until they attain grade level competency.

B. Evaluation - All elementary and secondary school students will be administered a pretest at the beginning of the program, and a posttest at the end of the program. Different forms of a standardized test will be utilized.

C. Facilities - At the elementary school level, the program is held at the Bayville, Brookville, and Locust Valley elementary schools. The secondary level program is carried out at the Locust Valley School.

Budget: $9,800

15. FAYETTEVILLE-MANLIUS

Learning Disabilities Center; 50 Disadvantaged Children

Nature of Project: The Center attempts to attack the problem of educational disability through a united and cohesive approach. It approaches the problem from two standpoints: diagnosis and remediation. The project is designed to better identify, and diagnose educational deficiencies presented by disadvantaged children and then improve their basic skills.

Procedure:

A. Program - A diagnostician and a school psychologist work as a team in identifying the special educational deficiencies of disadvantaged children. A mathematics clinician then provides remedial instruction. Individual or group instruction is provided based on the mathematical maturity of the child. Each child receives approximately 50 minutes of

instruction by the clinician twice a week, until the diagnosed difficulty is remedied. Classroom teachers acquire a better understanding and appreciation of the individual student's difficulties through conferences with the mathematics clinician.

Children in nonpublic schools are also referred to the Center.

B. Evaluation - The following standardized tests will be administered: California Arithmetic Test, Survey Test of Algebraic Aptitude, and Contemporary Mathematics Test. With careful diagnosis and instruction, children are expected to show significant gains between pretesting and posttesting.

C. Facilities - Since the highest concentrations of educationally deprived children are in the village of Manlius, the Center's headquarters are located in the Eagle Hill Junior High School. Such placement of the Center provides easy access to most of the schools in the district.

Budget: $60,400; mathematics allocation - $9,000

16. MEXICO

Developmental Program for Educationally Disadvantaged: 40 Disadvantaged Children

Nature of Project: Corrective and remedial mathematics instruction is provided those students identified as educationally disadvantaged in the area of mathematics. The instruction is provided on an individual and small group basis. A classroom, other than the regular classroom, is used. The program is conducted during regular school hours.

Procedure:

A. Program - The classroom teacher and the Title I teacher diagnose the need for corrective and/or remedial mathematics instruction. In the

majority of cases the instruction needed is in basic skills. Pupils are scheduled to meet with the Title I teacher, in a seperate classroom for approximately 45 minutes of instruction per day. The program is carried out during the child's regularly scheduled mathematics period. Class size varies, with the largest group having 5 pupils. There are two Title I teachers giving mathematics instruction. One works mainly with the primary grades, 1-3, and the second teacher is involved mostly with the intermediate grades, 4-6.

B. Evaluation - Progress of each pupil is evaluated by his regular classroom teacher and the Title I teacher. The main instrument used in the evaluation is the Metropolitan Achievement Tests. Also, every Tuesday afternoon, the 2 Title I teachers meet with the elementary supervisor and the school psychologist to discuss individual student's problems and progress.

C. Facilities - Two elementary schools are used for the program

Budget: $13,000

17. NEW ROCHELLE

Summer Workshop for the Development and Collation of Materials in Mathematics for Teaching Educationally Disadvantaged Children in Grades 1-3; 245 Disadvantaged Children

Nature of Project: Since the implementation of a "modern mathematics" curriculum in the primary grades in the fall of 1964, the district has become increasingly aware of the need for additional materials more suitable for the instruction of educationally disadvantaged children. The basic series presently being used by the school system, and all other available series, offer little in the way of an educationally effective program for these youngsters.

A workshop was conducted during July 1966, to develop and collate appropriate written materials and visual aids in mathematics to aid in the teaching of mathematics to educationally disadvantaged children in grades 1 through 3.

These materials included refinements of suggestions from teachers in the system based on their experiences with educationally disadvantaged children as well as a collection and expansion of suitable ideas put forth in all available commercial and noncommercial publications. The purpose was to improve the general level of attainment and to prevent the accrual of scholastic deficits as a result of ineffective teaching in the early grades.

Procedure:

A. Program - During the spring of 1966, teachers of grades 1-3 were polled to determine areas of greatest concern in the primary mathematics program in terms of the educationally disadvantaged children whom they teach. Suggestions for overcoming these areas of concern were also solicited. The workshop participants, selected from among the primary grade teachers, worked in grade level teams of 3, plus representatives from the nonpublic schools who were invited to participate in proportion to the numbers of educationally disadvantaged children in their school populations, to develop materials based on these suggestions, their own experiences, and published materials. While each team concentrated on its own grade level, provision was made for an interchange of ideas among teams.

This program, scheduled as an intensive workshop during the summer months, ran for 5 hours a day, 5 days a week, for the 4 weeks of July 1966.

The personnel included were:

(a) The Project Leader to direct and coordinate the activities of the workshop and its participants;

(b) 3 first-grade teachers, 3 second-grade teachers, and 3 third-grade teachers to serve as consultants in the development and collation of materials for their respective grades;

(c) 1 Typist to type and prepare multiple copies of the written materials

8. Evaluation - Fifty educationally disadvantaged children from each of grades kindergarten, one, and two, as of the school year 1965-66, were identified at random from among all educationally disadvantaged children in the system. For the purposes of this project, educationally disadvantaged children were defined as those children who were at least 6 months below mental age expectancy in the development of mathematical concepts as indicated by the results of the spring systemwide testing program.

These children, along with all other educationally disadvantaged children in the primary grades in the system, were taught during the 1966-67 school year using the materials developed during the summer workshop. The growth in understanding of mathematical concepts of the children under study would be measured by the average increase in the performance of the group in the achievement tests given during the spring of 1967.

One hundred of the educationally disadvantaged children in the study group were in either the kindergarten or first grade during the school year 1964-65. The scores of these children on the spring tests of 1965 were to be compared to the scores of the same children on the spring tests of 1966 to determine the growth in understanding during that

period. It would then be determined whether the average increase in the performance of these one hundred children was greater during the school year 1966-67 than it was during the previous year.

C. Facilities - Board of Education meeting rooms

Budget: $8,400

18. NEW YORK CITY

College Bound Summer Program; 2,200 Disadvantaged Students

Nature of Project: The summer session is providing the first high school experience for the vast majority of these disadvantaged children. The pupils work with many of the teachers who will be with them when the fall term begins, thus greatly easing the often difficult transition from elementary or junior high to the high school with its greater demands and academic standards.

Procedure:

A. Program - The 7 week summer session is held in 8 high schools, with the majority of students taking preninth year mathematics. It runs for 4½ hours daily. Pupils are under instruction from 9:00 a.m. to 12:00 noon (1½ hours of mathematics instruction, and 1½ hours of language arts) with the additional time reserved for tutoring.

The pupils receive instruction in classes of approximately 16, with the teacher being assisted in each class by a college student serving as a tutor.

B. Evaluation - To measure growth in power to handle mathematics concepts, a standardized achievement test in arithmetic will be given during the first and seventh weeks.

C. Facilities - The following high schools are utilized: Julia Richmond, Haaren, Walton, Morris, John Jay, Bushwick, George Wingate, and Long Island City.

Budget: $110,500

19. NEW YORK CITY

Corrective Mathematics Services for Disadvantaged Pupils in Nonpublic Regular Day Schools; 30,600 Disadvantaged Children

Nature of Project: The Corrective Mathematics Services program is designed to provide remedial mathematics instruction for disadvantaged pupils in the nonpublic schools. The schools included in this project serve attendance areas having high concentrations of low-income families. Each school enrolls many disadvantaged children who require specialized educational services.

The corrective mathematics teachers instruct small groups in separate rooms in order to meet the individual needs of the pupils. Regular classroom teachers consult the special teachers to improve the instructional program. Diagnostic testing is included as part of the instructional program by the assigned teachers.

Procedure:

A. Program - In grades 2 through 4, children are selected for the program on the basis of at least one year's retardation in mathematics; in grades 5 through 8 the basis is at least 2 year's retardation. As a pupil achieves grade level he leaves the program and is replaced by another child who is retarded in mathematics.

Teachers are trained to use a developmental mathematics approach which, while stressing basic facts, computational skills, and problem

solving, enables the children to "discover" relationships and form generalizations.

The pupil-teacher ratio for this program is 230 to 1, i.e., 1 corrective mathematics teaching position is provided for every 230 nonpublic school children who are eligible for corrective mathematics services.

The nonpublic schools participating in the program are selected on the basis of the needs of the pupils for corrective mathematics services. The number of teaching positions are determined according to the teacher-pupil ratio of 230 to 1.

The 230 children in the teacher-pupil ratio of 230 to 1, for the most part, are not in one school. The corrective mathematics teacher travels from school to school to serve the needs of the children.

In correcting the mathematics deficiencies of the children involved, each teaching position serves approximately 100 pupils per week. In the basic program the teacher instructs the pupils in groups of approximately 10, for 2 one hour sessions a week. Since the teacher uses 20 hours per week for instruction, 100 children are served.

Eligible children not being served by the corrective mathematics teacher at the outset of the program are placed on an eligible list. As pupils have their mathematics deficiencies remedied, they are replaced by eligible children from the waiting list.

The program supplies and materials include duplicating stencils, diagnostic tests, workbooks, practice materials, tens frames, squared materials, and fractional parts.

B. Evaluation - The evaluation of mathematics growth will be based primarily on the Metropolitan Achievement Test of Mathematics.

C. Facilities - 194 nonpublic schools are serviced

Budget: $926,000

20. NEW YORK CITY

The College Discovery and Development Program; 1,040 Disadvantaged Children

Nature of Project: The program was initiated in September 1965. It aims to discover and develop those educationally disadvantaged pupils with potential and prepare them for admission to college. The project takes 9th grade students whose record of achievement fails to reflect their actual potential, and through a program involving intensive guidance and instruction in small classes, it is hoped that students will be prepared for admission to college. Students who successfully complete the high school program are guaranteed admission to one of the units of the City University.

Procedure:

A. Program - The program now includes 6 High School Development Centers. They are in selected schools in attendance areas having a high concentration of low income families. The schools are coeducational with mixed ethnic groups.

The program provides for intensive instruction in small classes; 20 students are the maximum in one class. A double period of instruction is given in mathematics. There is a tutorial period at the end of the school day for those who need it with a ratio of 4 students to 1 college tutor. Regents courses in ninth, tenth, and eleventh year mathematics are the only courses offered.

Representatives from the college faculties of the 4 city

colleges serve as consultants to the heads of departments and teachers in each subject area.

B. Evaluation - The major portion of the evaluation will be accomplished by a research team of the Division of Teacher Education of the City University of New York and the New York City Board of Education.

Aptitude and achievement correlation studies of the test will be made. Longitudinal studies will be made of the test results in the tenth and twelfth grades.

Selected tests such as the following will be utilized: Regents examinations, Differential Aptitude Tests, and the Stanford Achievement Tests.

C. Facilities - The following high schools house the Centers: Seward Park, Theodore Roosevelt, Franklin K. Lane, Thomas Jefferson, Jamaica, and Port Richmond.

Budget: $1,104,000; mathematics allocation - $240,000

21. NORTHPORT

Elementary School Remedial and Corrective Program and Teacher Inservice Training; 450 Disadvantaged Children

Nature of Project: The project is conceived as one in which an intense effort is made to provide a range of teaching and instructional services geared to provide remedial, corrective, developmental, and supportive effort for the learner who has not been successful in mathematics.

In addition, the professional staff is involved in a formalized and structured inservice training program designed to improve its ability to individualize instruction through study of organization, child development, and the learning process.

Procedure:

A. Program - Educationally disadvantaged mathematics students in grades 1-6 are enrolled, based upon quantitative and qualitative factors related to the student's disadvantagement, in centers located in 2 elementary schools of the district for a 23 day period for 3½ hours per day.

In each center, teachers, college interns, and teacher aides are organized into 3 teams, each of which works with children of a 2 year age/grade span. Each team works with approximately 75 children. There is a total of 6 teams in the 2 centers.

Each team consists of 5 members. The team leader is a highly experienced and qualified teacher, selected upon the basis of leadership and organizational ability, as well as competence in the subject areas. The remaining 4 members of the team consist of 2 qualified and experienced teachers, 1 qualified beginning teacher, and 1 college senior who is training to be a teacher.

All members of the professional staff are involved with instruction of students from 8:30 a.m. until 12:00 noon. From 1:15 p.m. until 3:30 p.m., on Monday, Wednesday, and Friday, staff members are in an organized, structured class taught by the mathematics coordinator and university consultants.

On Tuesdays and Thursdays, during the same hours, the staff members meet as teams for the purpose of planning, evaluation, and curriculum development.

B. Evaluation - Students will be evaluated before and at the conclusion of the program. The Iowa Tests of Basic Skills, and the Metropolitan Achievements Tests will be utilized.

C. Facilities - The 2 centers are located in 2 modern elementary schools of the district.

Budget: $13,800

22. PLAINVIEW

Skills Laboratory in Mathematics for Grades 7-10; 250 Disadvantaged Children

Nature of Project: Approximately 7 percent of the youngsters in grades 7-10 have been identified as educationally disadvantaged students. These students will receive, in addition to regular classes, compensatory education in remedial mathematics.

An inservice workshop for teachers of these classes was conducted in the spring of 1966, as well as curriculum development during the summer of 1966, to prepare for the basic program in the school years of 1966-67 and 1967-68.

Procedure:

A. Program - At each grade level, 25 to 30 students in public schools, (approximately 14 students in the parochial school), in each secondary school are selected to participate in the program. These students have tested scholastic ability on the Otis Intelligence Test of 90+, and are one and a half years or more below grade level in mathematics.

The students in the public school are placed in the same mathematics classes which meet 4 to 5 times a week. The students then are divided into groups of approximately 7, and receive 2 additional periods per week.

Preparation for the program to assure maximum readiness con-

sisted of an inservice workshop in mathematics skills for teachers.

A pilot program of curriculum development correlated with instruction involving selected students in grades 7-10 was held for 6 weeks during the summer of 1966 for 1 hour per day.

B. Evaluation - The following standardized tests will be utilized--Iowa Test of Basic skills, Otis Quick Scoring Intelligence Test, Differential Aptitude Test, and the Mathematics Cooperative Achievement Test.

C. Facilities - The schools involved are the Plainview-Old Bethpage Junior High School, Mattlin Junior High School, St. Pius X Parochial School, Plainview-Old Bethpage Senior High School, and John F. Kennedy High School.

Budget: $23,500

23. PULASKI

Strengthening the Mathematics Curriculum for Educationally Disadvantaged Children; 125 Disadvantaged Children

Nature of Project: The strengthening of the curriculum is through the following interrelated phases: establishment of a computational skills program; addition of appropriate courses for the lower achieving and/or educationally disadvantaged student; development of a Basic Mathematics Two course, laboratory approach, and an intermediate algebra course, with applications as appropriate; addition of a combined mathematics laboratory and curriculum materials center, and addition of a full-time mathematics teacher.

Procedure:

A. Program - The additional full-time teacher is responsible for the administration of the skills program, development and teaching (2

sections) of the basic math laboratory course, assisting in the laboratory program, and the development and teaching of the intermediate algebra course.

The computational skills program involves students from grades 6-9 approximately 2 days a week. Students needing remedial work in the computational skills as determined by the SRA Basic Skills in Arithmetic Tests, use the SRA Computational Skills Kits as appropriate.

Students enrolled in the courses of prevocational mathematics and General Mathematics 2 are full-time students. The low achieving at grades 7, 8, 9 are full-time also.

The math lab, its equipment and materials, are available for independent study whenever students have available time.

B. Evaluation - (1) Skills program - An analysis of the Henmon-Nelson Achievement Test (Grade 6), using both verbal and quantitative scores, the Arithmetic Tests for New York State Elementary Schools, Grade 6, the Minimum Competence Test in Arithmetic Fundamentals for New York State Secondary Schools, (September, Grade 7), past achievement records, and teacher recommendation will provide a basis for selection of students to participate herein.

Upon completion of the skills program, the Minimum Competence Test in Arithmetic Fundamentals for New York State Secondary Schools will again be administered and results compared. The SRA Kit also includes periodic and final achievement tests for use in evaluation of the program.

(2) Curriculum expansion - Evaluation of this part of the program will be largely subjective. Periodic and final objective examinations will be administered and analyzed.

Selection of students for this track will be based on the Henmon-Nelson Achievement Test (Grade 6) and the Arithmetic Tests for New York State Elementary Schools, Grade 6, and teacher recommendation of both mathematical achievement and overall ability and readiness.

The New York State Junior High School Survey Test in Mathematics, administered in the twentieth week of the 8th grade will be analyzed to compare students in this track with those in the regular track. Both tracks of the 7th grade will have taken the Survey Test at the beginning of Grade 7.

(3) Course development - Overall evaluation will be subjective with periodic and final examinations being administered and analyzed.

Progress of course evaluated through teacher tests and evaluation of laboratory reports.

(4) Combined mathematics laboratory and curriculum materials center - Evaluation will be subjective from student reaction, school reaction, parent and community response. Teacher and student use of materials would be recorded and evaluated.

(5) Additional personnel will be evaluated through normal administrative channels using accepted professional criteria.

C. Facilities - The program is held at the Pulaski Academy and Central School.

Budget: $16,000

24. WARRENSBURG

Developmental Instruction in All Basic Skills and Reduction of Class Size; 45 Disadvantaged Children

Nature of Project: Extra teachers are hired with the immediate result of

reducing class size. An emphasis on developmental instruction in all basic skills is the primary objective of the project.

Procedure:

A. Program - Three extra teachers were hired. Reduction of class size is accomplished by establishing a new section for each extra teacher. Each new section is a combination of 2 grades. They are: grades 1 and 2, grades 3 and 4, and grades 5 and 6. Each of these sections has a stated maximum class size of 15 students. Through the reduced class size in each of the 3 new sections, more small group instruction is taking place. Increased individual attention is provided each educationally disadvantaged child.

B. Evaluation - The evaluative instruments to be utilized in this project will be those of the regular school testing program. Currently used in the school system are the Iowa Tests of Basic Skills, Metropolitan Achievement Tests, and the Stanford Achievement Tests.

C. Facilities - The elementary school

Budget: $31,700; mathematics allocation - $7,900

25. WASHINGTONVILLE (Blooming Grove 2)

Developmental Mathematics K through 12 for the Improvement of Teaching Educationally Disadvantaged Students; 500 Disadvantaged Children

Nature of Project: A 10-week inservice course in Modern Mathematics is being conducted for all elementary teachers with the accent on improving the quality of teaching for the educationally deprived student of which there are approximately 30 percent in heterogeneous grouped elementary classrooms. This course will directly improve the curriculum in mathematics for the educationally disadvantaged. In addition, it will

strengthen the K through 12 developmental math program for the educationally deprived by making materials and equipment readily available to assist teachers in instruction.

In conjunction with the inservice course, grade-level meetings are held for the development of curriculum and application of Modern Mathematics for teaching the educationally deprived.

On the secondary level, overhead projectors were purchased for basic groups (educationally deprived). These projectors are of direct value in helping to improve the teaching of mathematics.

Procedure:

A. Program - A 10-week, 20 hour inservice training course for modern mathematics, with accent on improving the quality of teaching the educationally deprived, is being conducted. A skilled and experienced consultant has been secured. He has attended and taught many programs and courses in modern mathematics and is now a faculty member at New Paltz State College. The teachers taking the course are furnished with the necessary materials and in addition, will receive inservice credit. All teachers of the private school located in the school district have been invited to participate in the program and have the same opportunities for improvement of their competencies, skills, and techniques.

The overhead projectors are furnished for all classrooms on the secondary level in which basic mathematics (educationally disadvantaged) is taught. The Audiovisual Coordinator gives instruction in their use. The overhead projectors definitely enhance the teaching of mathematics to the disadvantaged, and directly improve the teachers' techniques and skills.

There are 6 classes of basic mathematics for the educationally deprived and the projectors are used in these classes.

A remedial arithmetic program is available for all students in the school district during the summer.

B. Evaluation - The following listed means to identify the educationally disadvantaged are utilized:

1. Teacher and staff observation and evaluation;

2. Mandated State tests in arithmetic competency;

3. Iowa Tests of Basic Skills;

4. In addition, many other quantitative and qualitative criteria are used.

Approximately 30 to 35 percent of the elementary and secondary students are at or below the 30th percentile in mathematics achievement according to the Iowa Tests of Basic Skills.

In evaluating the inservice program on modern math in the elementary school, the committee approach will be used. A committee of teachers and administrators will make a written evaluation of the course.

C. Facilities - An elementary school located in the district

Budget: $3,250

DEVELOPMENT OF A TITLE I, ESEA MATHEMATICS PROJECT

The development of a comprehensive mathematics project under Title I - ESEA is constructed with the thought of the project becoming functionally integrated into the overall school program.

Four general areas constitute a project format: pupil evaluation, curriculum development, teacher training, and classroom organizational structure. Each of these areas is interrelated and developed in that context.

Pupil evaluation consists of three phases: identification, diagnosis, and achievement. The first step is identification of the mathematically disadvantaged. The U. S. Office of Education, in its pamphlet, School Programs for Educationally Deprived Children, states: "Educationally deprived children are children whose educational achievement is below that normally expected of children of their age and grade, ..." Extending this statement into a working definition are the following criteria for mathematical disadvantage:

> Primary grades (1-3) - below grade level achievement.
> Intermediate grades (4-6) - below grade level achievement of 2 years or more, or functioning below the 30th percentile on a standardized test.
> Secondary grades (7-12) - same criteria as intermediate grades, or having a 25 percentile differential between ability and achievement on standardized tests.

The most commonly utilized standardized achievement tests in New York State at grades 1 through 6 are the Iowa Tests of Basic Skills (3-6), Metropolitan Achievement Tests, and Stanford Achievement Tests. In grades 7-12 the achievement tests used most often are either the Iowa Tests of Basic Skills (7-9), or the Iowa Tests of Educational Development (9-12). The popular aptitude tests in grades 7-12 are the California Test of

Mental Maturity, Differential Aptitude Tests (8,9), and Otis Mental Ability Test.

The New York State Pupil Evaluation Program (PEP) examinations, along with the standardized tests, service this phase as well as the other two phases of pupil evaluation. A listing of the PEP mandated tests follows:

Grade 1 - New York State Readiness Tests
Grades 3 & 6 - Arithmetic Tests for New York State Elementary Schools
Grade 9 - Minimum Competence Test in Arithmetic Fundamentals for New York State Secondary Schools

Other New York State tests available at the junior high level are: the New York State Junior High School Scholastic Ability Test and the New York State Junior High School Survey Test in Mathematics.

After identification is diagnosis. The effectiveness of diagnosis increases in value as it passes from a mere locating of the difficulty to an analysis of its causes. Test perusal and teacher observation are utilized in this phase. General areas of difficulty are discovered by investigating test results, while the specific nature and analysis of the student's difficulty is determined by teacher observation.

Teacher observation has few of the limitations of testing as to time and place. It imposes no unusual restrictions and exposes children to no unnatural tensions. Whereas tests are a description of a particular performance in a particular situation, informal observation can seize each instance of significant behavior as it occurs, along with the prior and accompanying behavior.

The final phase in pupil evaluation is the determination of the student's level of achievement. In a Title I project interest is focused upon the difference between achievement levels of the student at the

beginning of the project year, and at the end of the project year. A significant difference between pretest and posttest scores for most students tends to indicate a successful project.

Curriculum development is the next area to be considered. A broad statement of desired outcomes is decided upon before any other work in this area is contemplated. The three general outcomes that mathematics instruction strives for are: computational skills, mathematical understanding, and problem solving. After the outcomes are decided upon, curriculum materials are developed.

Current thinking on curriculum emphasis for educationally disadvantaged students leans strongly toward academic content. Many renowned educators advocate this approach. Kenneth Clark, a Regent of the University of the State of New York, in Dark Ghetto, says: "The evidence .... seems to indicate that a child who is expected by the school to learn, does so; the child of whom little is expected produces little. Stimulation and teaching based upon positive expectation seems to play (an) important role ..." Carl Hansen, superintendent of schools in Washington, D.C., at a University of Detroit Symposium on the low achiever, said: "The primary responsibility of the formal educational systems of the country is to prepare for intelligent behavior, ... We are saying that every child - the slow, the average, and the bright - is capable of responding to growth in mental discipline, and that our responsibility is to discover the techniques ... by which it will be possible to use ... the rational processes of his mind ..."

The materials provide for the development of mathematical understandings for vocational competence. Opportunity for success is a major aim in the design of materials. To achieve this success the learning

materials are graded in content to meet the differing rates of student learning. Units are short, and provide various approaches to the development of mathematical concepts.

Teacher training is best carried out in conjunction with curriculum development. Five topics need to be concentrated upon in this area:

1. Mathematics programs and modern instructional techniques
2. Characteristics of the educationally disadvantaged
3. Emphasis on instructional techniques for the low achiever
4. Curriculum and textbook examination and study
5. Purposes and procedures of evaluation

The updated presentation of mathematics instruction is aimed at bringing to light all of the underlying structural properties, and, to show how certain mechanical algorisms will produce desired results. The object is to teach the algorism but only after leading the students, using the method of guided discovery, step by step through the background which makes the algorism possible. Disadvantaged students require a modified, structural approach.

Characteristics of culturally deprived children are discussed candidly. Units such as home environment, language, cognition and learning, intelligence and aptitudes, personality and motivation, and school achievement are used as a basis for discussion.

In the area of instructional techniques, there is a need for clarity of structure, remediation of large deficits in common knowledge and skills, and individualized instruction. Teaching is directed toward simple, clear, achievable goals. The means designed to accomplish them must be understood by the children. Immediate rewards for successful performance heighten motivation. The research on motivation suggests the need for developing school programs adapted to the motivational patterns of these children, and then developing methods by which this motivational and

reward system will be altered to the present motivational patterns.

Tasks are challenging, but not discouraging. Even short-range training in perceptual skills, following directions, and other tasks has produced marked increases in intelligence test performance.

Disadvantaged children have shown difficulty in developing concepts of an abstract nature and in generalizing. Therefore, teachers provide a saturation approach for materials that are to be retained.

An integral part of teacher training is review and study of the developed curriculum materials to be implemented in the classroom. Closely allied with this is the study of the textbook (s) to accompany the curriculum materials.

Purposes and procedures of evaluation provide an overview of their areas, and cover the first section on pupil evaluation. The chief purposes of evaluation are to:

1. Diagnose class and individual ability
2. Inventory knowledge and abilities
3. Determine the extent of learning over a limited period
4. Measure learning over a relatively long period
5. Obtain rough measures for comparative purposes

Four general classes of evaluation techniques considered, are:

1. Paper-and-pencil tests
2. Teacher observation
3. Individual interviews and conferences with pupils
4. Pupil reports and projects

The last area is that of classroom organizational structure. This is where the other three areas of evaluation, curriculum development, and teacher training, are put in operation. A full school year program is emphasized because of the eventual assimilation into the total school program. A possible summer session could be included for reinforcement of fundamentals and/or enrichment.

The environment of disadvantaged children causes depression of intellectual functioning. Provision for a more adequate environment can result in a considerable increase in aptitude, learning, and achievement. A child's full learning ability will be realized when a proper home environment is supported by good environmental conditions in the school. These conditions are fostered by various classroom organizational patterns. To identify a few: interclass or intraclass ability grouping, ungraded classes, and small group instruction. In the intermediate grades particularly, the Dual Progress Plan (DPP) and the Joplin Plan are two types of classroom patterns. The mathematics part of the DPP has ungraded classes taught by elementary mathematics specialists. In the Joplin Plan, all the classes at a particular grade level are ability grouped for mathematics instruction, and taught by regular elementary teachers.

The particular structure decided upon, and the mathematics project developed under Title I, ESEA, should be an outgrowth of the local system's educational philosophy so as to fit into the overall school program.